

WE CLAIM:

1. A cap chute end subassembly for capping a container, comprising
a fluid manifold for injecting a first fluid into said container;
said fluid manifold having a plurality of manifold apertures;
a fluid shoe operatively adjacent said fluid manifold for injecting a
5 second fluid into said container following said injection of first fluid;
a frame that supports said fluid shoe and configured to hold a
plurality of caps;
a wiper supported by said frame; and
a pair of arms operatively adjacent said wiper.
2. The subassembly of Claim 1, wherein said first fluid and second
fluid are the same.
3. The subassembly of Claim 1, wherein said first fluid and second
fluid are different.
4. The subassembly of Claim 1, wherein said first fluid and second
fluid are a gas.
5. The subassembly of Claim 1, wherein said first fluid and second
fluid are a liquid.
6. The subassembly of Claim 1, wherein said fluid manifold and fluid
shoe are in fluid communication with one another.
7. The subassembly of Claim 1, wherein said fluid shoe comprises a
plurality of shoe apertures.

8. The subassembly of Claim 1, wherein said wiper depresses said cap onto said container.

9. The subassembly of Claim 1, wherein said pair of arms hold said cap for receipt by said container.

10. A cap chute end subassembly for capping a plurality of in-line containers in an ambient atmosphere, comprising

a fluid manifold having a plurality of first manifold apertures for injecting a first fluid into said plurality of containers;

5 a fluid shoe operatively adjacent said fluid manifold;

said fluid shoe having a plurality of shoe apertures for dispensing a second fluid into said plurality of caps and plurality of containers;

a frame that supports said fluid shoe;

10 said frame being configured to receive a plurality of caps at a receiving end of said frame;

a wiper supported at a dispensing end of said frame;

a pair of arms operatively adjacent said fluid shoe; and

said pair of arms being configured to orient said plurality of caps to said plurality of containers.

11. The subassembly of Claim 10, wherein said first fluid and second fluid are the same.

12. The subassembly of Claim 10, wherein said first fluid and second fluid are a gas.

13. The subassembly of Claim 10, wherein said plurality of shoe apertures comprise:

a plurality of first shoe apertures that inject said second fluid into said containers; and

5 a second shoe aperture that injects said second fluid into said caps following the injection of said second fluid into said containers.

14. The subassembly of Claim 10, wherein said pair of arms receives said plurality of caps at said dispensing end of said frame.

15. The subassembly of Claim 14, wherein said pair of arms enables said plurality of containers to receive said plurality of caps.

16. The subassembly of Claim 15, wherein said pair of arms holds said plurality of caps for injection of said second fluid into said caps.

17. The subassembly of Claim 16, wherein said pair of arms hold said plurality of caps at an acute angle to planes of openings of said containers.

18. The subassembly of Claim 17, wherein said second fluid is directed into said containers upon said second fluid being injected into said caps.

19. The subassembly of Claim 17, wherein said wiper places said plurality of caps parallel to said planes of openings after said second fluid is injected into said caps.

20. A cap chute end subassembly for capping a plurality of in-line containers in an ambient atmosphere, comprising

a gas manifold having a plurality of first manifold nozzles for injecting a non-oxygen bearing gas into said plurality of containers;

5 a gas shoe operatively adjacent said gas manifold;

said fluid shoe having a plurality of first shoe nozzles and a second shoe nozzle;

said first shoe nozzles for injecting said non-oxygen bearing gas into said plurality of containers;

10 said second shoe nozzle for injecting said non-oxygen bearing gas into said plurality of caps;

a frame that supports said fluid shoe;

said frame being configured to receive a plurality of caps at a receiving end of said frame;

15 a wiper supported at a dispensing end of said frame;

a pair of arms operatively adjacent said fluid shoe; and

said pair of arms being configured to orient said plurality of caps such that said non-oxygen bearing gas is directed into said plurality of caps and then into said plurality of containers.

21. The subassembly of Claim 20, wherein said first manifold nozzles direct said non-oxygen bearing gas in a direction substantially perpendicular to planes of openings of said plurality of containers.

22. The subassembly of Claim 20, wherein said first shoe nozzles direct said non-oxygen bearing gas in a direction substantially perpendicular to planes of openings of said plurality of containers.

23. The subassembly of Claim 20, wherein said first shoe nozzles inject said non-oxygen bearing gas into one of said containers after said first manifold nozzles inject said non-oxygen bearing gas into said one of said containers.

24. The subassembly of Claim 20, wherein said non-oxygen bearing gas injected into said plurality of caps is subsequently directed into said plurality of containers.

25. The subassembly of Claim 20, wherein said plurality of containers are moving in-line at least at about 275 containers per minute.

26. A fluid manifold in a cap chute end subassembly for capping a plurality of in-line containers, comprising:

a fluid channel extending through said fluid manifold;

5 a plurality of fluid manifold apertures in fluid communication with said fluid channel;

said fluid manifold apertures being configured and dimensioned to inject a first fluid into said containers such that said containers receive a continuous injection of said first fluid.

27. The fluid manifold of Claim 26, wherein the manifold apertures each have the same configuration.

28. The fluid manifold of Claim 26, wherein at least two manifold apertures have different configurations.

29. The fluid manifold of Claim 26, wherein said manifold apertures are equidistant from one another along a longitudinal axis of said fluid manifold.

30. The fluid manifold of Claim 26, wherein at least three of said manifold apertures are of different distances from one another along a longitudinal axis of said fluid manifold.

31. The fluid manifold of Claim 26, wherein said manifold apertures have the same orientation to one another.

32. The fluid manifold of Claim 26, wherein at least three of said manifold apertures have differing orientations to one another.

33. The fluid manifold of Claim 26, wherein said manifold apertures produce at least one fluid spray pattern in the form of a cylinder.

34. The fluid manifold of Claim 26, wherein said manifold apertures produce at least one fluid spray pattern in the form of a cone.

35. The fluid manifold of Claim 26, wherein said fluid manifold is in an ambient atmosphere.

36. A fluid shoe in a cap chute end subassembly for capping a plurality of in-line containers, comprising:

a plurality of first shoe apertures for injecting a first fluid into said containers; and

5 a second shoe aperture for injecting a second fluid into said containers.

37. The fluid shoe of Claim 36, wherein said first fluid and second fluid are the same.

38. The fluid shoe of Claim 36, wherein the first shoe apertures each have the same configuration.

39. The fluid shoe of Claim 36, wherein at least two of the first shoe apertures have different configurations.

40. The fluid shoe of Claim 36, wherein said first shoe apertures are equidistant from one another along a longitudinal axis of said fluid shoe.

41. The fluid shoe of Claim 36, wherein at least three of said first shoe apertures are of different distances from one another along a longitudinal axis of said fluid shoe.

42. The fluid shoe of Claim 36, wherein said first shoe apertures have the same orientation to one another.

43. The fluid shoe of Claim 36, wherein at least three of said first shoe apertures have differing orientations to one another.

44. The fluid shoe of Claim 36, wherein said first shoe apertures produce at least one fluid spray pattern in the form of a cylinder.

45. The fluid shoe of Claim 36, wherein said first shoe apertures produce at least one fluid spray pattern in the form of a cone.

46. The fluid shoe of Claim 36, wherein said fluid shoe is in an ambient atmosphere.

47. A method of capping a plurality of containers in an ambient atmosphere, comprising
- injecting a first fluid into said containers;
 - injecting a second fluid into said containers;
 - 5 orienting a plurality of caps to said containers;
 - injecting a third fluid into said caps;
 - placing said caps onto said containers after injecting said third fluid into said caps; and
 - 10 said steps of injecting said first, second, and third fluids; orienting said caps; and placing said caps occurring in said ambient atmosphere.

48. The method of Claim 47, further comprising moving said containers in an in-line orientation to one another.

49. The method of Claim 48, wherein said first, second, and third fluids are the same.

50. The method of Claim 48, wherein at least two of said first, second, and third fluids are different.

51. The method of Claim 48, wherein said first, second, and third fluids are each a gas.

52. The method of Claim 48, wherein at least one of said first, second, and third fluids is a liquid.

53. The method of Claim 48, wherein injecting said second fluid into at least one of said containers occurs after injecting said first fluid into said at least one of said containers.

54. The method of Claim 53, wherein injecting said third fluid into at least one of said caps occurs after injecting said second fluid into said at least one of said containers.

55. A method of capping a plurality of in-line containers in an ambient atmosphere, comprising

5 injecting a first fluid into said plurality of containers;
injecting a second fluid into said plurality of containers after
injecting said first fluid;
orienting a plurality of caps to said plurality of containers;
injecting said second fluid into said plurality of caps after orienting
said plurality of caps; and
10 placing said plurality of caps onto said plurality of containers after
injecting said second fluid into said plurality of caps.

56. The method of Claim 55, wherein said first and second fluids are the same.

57. The method of Claim 56, further comprising directing said second fluid from said caps and into said containers.

58. The method of Claim 57, further comprising maintaining a continuous injection of said first fluid into said containers until injecting said second fluid into said containers.

59. The method of Claim 58, further comprising maintaining a continuous injection of said second fluid into said containers until injecting said second fluid into said caps.

60. A method of capping a plurality of in-line containers in an ambient atmosphere, comprising

injecting a first non-oxygen bearing gas into said plurality of containers;

5 said injecting a first non-oxygen bearing gas occurring through a plurality of first apertures to maintain a continuous injection of said first non-oxygen bearing gas into said containers moving in-line;

 injecting a second non-oxygen bearing gas into said plurality of containers after injecting said first non-oxygen bearing gas;

10 said injecting a second non-oxygen bearing gas occurring through a plurality of second apertures to maintain a continuous injection of said second non-oxygen bearing gas into said containers moving in-line;

 orienting a plurality of caps to a plurality of planes of openings of said containers;

15 injecting a third non-oxygen bearing gas into said plurality of caps after orienting said plurality of caps;

 injecting said third non-oxygen bearing gas into said plurality of containers; and

20 placing said plurality of caps onto said plurality of containers after injecting said third non-oxygen bearing gas into said plurality of containers.

61. The method of Claim 59, further comprising maintaining a continuous flow of first and second non-oxygen bearing gases into said containers.

62. The method of Claim 60, wherein said second and third non-oxygen bearing gases are the same.

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~~62.~~ The method of Claim 61, wherein said first, second, and third non-oxygen bearing gases are the same.

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~~63.~~ The method of Claim 62, wherein said caps are oriented at acute angles to said planes of openings.

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~~64.~~ The method of Claim 63, wherein injecting said third non-oxygen bearing gas into said containers comprises directing said third non-oxygen bearing gas from said caps and into said containers.

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~~65.~~ The method of Claim 64, further comprising moving said containers at least at about 275 containers per minute.